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Pregnancy Plights

Stress during pregnancy leads to lower reproductive success in Asian elephants



by Savannah N. Miller

There's an ongoing debate on whether life begins at conception or after birth, but according to a study published in *Nature* by Hannah Mumby and colleagues, parenthood and childcare begins long before the offspring is even born. The behavior and life factors that affect elephant mothers have been shown to correlate with reproductive foibles in offspring later in life. In elephant populations, calves born into the high stress seasons reproductively developed earlier than their peers born in calmer conditions. Furthermore, those that developed earlier also had less reproductive success over their lifetime. Why is this the case, though?

“...calves born into the high stress seasons reproductively developed earlier than their peers born in calmer conditions.”

In this study, *Elephas maximus*, better known as Asian elephants, employed in the Myanmar timber industry were studied to determine how variation in lifestyle and routine affected their young. Researchers chose to focus on elephants because they live such long lives, upwards of 80 years, which can be comparable to human life spans. The study measured stress levels by taking fecal samples of sexually mature females. The amount of stress was indicated by the concentration of glucocorticoid metabolites in the fecal matter; these are molecules that are found in high concentration when the body is under stress.



Glucocorticoid metabolites in older, non-pregnant, non-lactating females were studied for a year. The stress-indicating molecules were found to be in the highest concentration in fecal matter during the June, July, and August, also known as the “high stress months.” Birth rates plummet at peak stress times, and when offspring were born in these months they had fewer chances of survival compared with those who were born during calmer periods throughout the year. The mothers have higher concentrations of these metabolites during peak stress months because their bodies are the most energetically challenged during this time. Talk about blaming mom for ruining your life.

Mothers in this timber industry are sometimes not determined to be pregnant until a year into the two-year gestation period, or length of pregnancy. This means they will continue to work in high stress environments until their handlers pull them out of work. In natural environments, elephants would probably not be inclined to mate during peak stress times due to behavior modification via natural selection. When the elephants don't conceive during high stress season, their offspring are not born into high stress months, and thus not subjected to unnecessary traumas. Less stress means greater reproductive success.

Though elephants and humans are only distantly related, the mechanisms behind these metabolic anomalies in elephants can still be applied to pregnant human mothers and their children. Because our life spans are similar in length, our life cycles sync up fairly well with elephants'. Though we, as humans, are often engrossed in our day-to-day lives, with jobs, school, and families to worry about, we should remember that other animals undergo stress, too. Through studies like this one, we can learn a great deal from their behavior and apply it to human behavior accordingly. 🐾